

IMPROVEMENT METHODS APPLIED IN OPERATIONS MANAGEMENT:
A SURVEY OF THE PRACTICES OF KENYAN FIRMS LISTED AT THE
NARIOBI STOCK EXCHANGE



BY

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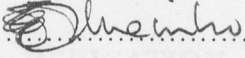


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DECLARATION

This research project paper is my original work and has not been submitted for a degree in any other university.

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This paper would not have been possible without the valuable support, assistance and constructive criticism from my colleagues and my family members. I would like to express my heartfelt appreciation and gratitude to all of them in general and acknowledge a few names.

I am grateful to my advisor Mr. John Kambuzi whom I would like to acknowledge for his special guidance, advice, patience, availability and valuable contribution during the entire period of the study. It is a pleasure to mention his unparalleled support and help in this regard.

DEDICATION

I am also deeply indebted to those family members in Nairobi who have cooperated with me and to all those people who worked so hard in one way or the other to make my study possible.

In memory of my late father Edward Ombura Otuoro, for his wisdom that has been the guiding principle in my quest for education and knowledge.

To my family members, I would like to express special thanks to my spouse Pamela, daughter Tracy and son Wesley for their patience, understanding, support and love during the course period of my MBA course. For being with me in their thoughts and prayers despite my long absence from home.

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TABLE OF CONTENTS

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TABLE OF CONTENTS

Page

| | |
|---------------------|----|
| ACKNOWLEDGMENT..... | I |
| LIST OF TABLES..... | IV |
| ABSTRACT..... | V |

CHAPTER ONE INTRODUCTION

| | |
|-----------------------------------|---|
| 1.1. BACKGROUND..... | 1 |
| 1.2. RESEARCH PROBLEM..... | 4 |
| 1.3. OBJECTIVES OF THE STUDY..... | 5 |
| 1.4. IMPORTANCE OF THE STUDY..... | 5 |

CHAPTER TWO LITERATURE REVIEW

| | |
|---|----|
| 2.1 IMPROVEMENT TECHNIQUES: HISTORICAL PERSPECTIVE..... | 6 |
| 2.2 UNDERSTANDING IMPROVEMENT METHODS..... | 8 |
| 2.3 OPERATIONS DOCUMENTATION..... | 9 |
| 2.4 PERFORMANCE MEASUREMENT..... | 10 |
| 2.5 BUILDING IMPROVEMENTS..... | 12 |
| 2.6 CLASSIFICATION OF IMPROVEMENT METHODS..... | 13 |
| 2.7 POPULARITY OF THESE METHODS..... | 15 |
| 2.8 THE CONDITIONS THAT GOVERN THEIR CHOICE..... | 16 |
| 2.9 COMBINING IMPROVEMENT METHODS..... | 16 |

CHAPTER THREE RESEARCH METHODOLOGY

| | |
|---------------------------|----|
| 3.1. RESEARCH DESIGN..... | 18 |
| 3.2. THE POPULATION..... | 18 |
| 3.3. DATA COLLECTION..... | 18 |
| 3.4. DATA ANALYSIS..... | 18 |

CHAPTER FOUR DATA ANALYSIS AND FINDINGS

| | |
|---|----|
| 4.1. INTRODUCTION..... | 20 |
| 4.2. GENERAL OVERVIEW OF THE FIRMS..... | 20 |
| 4.3. OPERATIONAL PRIORITIES IN THE FIRMS..... | 22 |
| 4.4. PERFORMANCE MEASUREMENT SYSTEM..... | 23 |
| 4.5. APPROACHES TO BUILDING IMPROVEMENT PROGRAMS..... | 23 |
| 4.6. FAMILIARITY WITH IMPROVEMENT PROGRAMS..... | 24 |
| 4.7. THE EXTENT OF USAGE OF IMPROVEMENT METHODS..... | 25 |
| 4.8. SITUATION IN WHICH SUCH METHODS ARE APPLICABLE..... | 28 |
| 4.9. IMPACT OF IMPROVEMENT METHOD ON PERFORMANCE..... | 29 |
| 4.10. PROBLEMS AND ISSUES ENCOUNTERED WITH IMPROVEMENT METHODS..... | 30 |
| 4.11. METHODS USED IN THE MANUFACTURING AND SERVICE SECTORS..... | 31 |

CHAPTER FIVE CONCLUSIONS AND RECOMMENDATIONS

| | | |
|------------------|---------------------------------------|----|
| 5.1. | SUMMARY AND CONCLUSIONS..... | 32 |
| 5.2. | RECOMMENDATIONS..... | 35 |
| 5.3. | LIMITATIONS OF THE STUDY | 36 |
| 5.4. | SUGGESTIONS FOR FURTHER RESEARCH..... | 37 |
| REFERENCES | | 38 |
| ANNEXES | | |
| APPENDIX I | | 42 |
| APPENDIX II..... | | 51 |

LIST OF TABLES

| | |
|---|----|
| TABLE 4.0 NAIROBI STOCK EXCHANGE MARKET SEGMENTS | 20 |
| TABLE 4.1 FIRMS OWNERSHIP STRUCTURE | 21 |
| TABLE 4.2 INDUSTRY CLASSIFICATIONS | 21 |
| TABLE 4.3 YEARS IN BUSINESS/OPERATIONS | 21 |
| TABLE 4.4 NUMBERS OF EMPLOYEES | 21 |
| TABLE 4.5 OPERATIONAL PRIORITIES | 22 |
| TABLE 4.6 PERFORMANCE MEASUREMENT SYSTEMS | 23 |
| TABLE 4.7 APPROACHES TO BUILDING IMPROVEMENT PROGRAMS | 23 |
| TABLE 4.8 FAMILIARITIES WITH IMPROVEMENT METHODS | 24 |
| TABLE 4.9 EXTENT OF USAGE OF IMPROVEMENT METHODS | 25 |
| TABLE 4.9A QUALITY-BASED METHODS | 25 |
| TABLE 4.9B ACTIVITY-BASED METHODS | 26 |
| TABLE 4.9C EMPLOYEE-BASED METHODS | 26 |
| TABLE 4.9D TIME-BASED METHODS | 27 |
| TABLE 4.9E TECHNOLOGY-BASED METHODS | 27 |
| TABLE 4.9F PROCESS-BASED METHODS | 27 |
| TABLE 4.10 APPLICATION SITUATION | 28 |
| TABLE 4.11 IMPACT ON PERFORMANCE | 29 |
| TABLE 4.12 PROBLEMS AND CONSTRAINTS ENCOUNTERED | 30 |
| TABLE 4.13 THE MANUFACTURING AND SERVICE SECTORS | 31 |

ABSTRACT

This study sought to address the issue of improvement methods applied in operations management. The improvement methods were categorized into six based on common perspectives, similar languages and shared tools, which by no means show all possible methods. Therefore the six improvement methods analysed in these study were basically the following, quality-based, activity-based, time-based, employee-based, technology-based and process-based methods.

Thus the objectives of the study were to analyse the extent of usage of these improvement methods available in operations management by firms listed in the Nairobi stock exchange, establish whether usage of such improvement methods leads to better performance and problems or constraints encountered when implementing such programs or methods. Also explored were the approaches to building improvement programs, familiarity, operational priorities, performance measurements systems used and situations in which improvement methods are applied.

The motivation behind this study was to determine the improvement methods applied by organizations in order to remain competitive in the current globalization challenges, stimulate interest among managers and decision makers on the potential of improvement methods for building new operational capabilities and assist in identification of problems that face firms in their improvement programs implementation and hence provide them with valuable input into their improvement activities.

Cross sectional survey was used in this study. Primary data was collected by use of a questionnaire. The data was obtained from twenty firms out of the forty-four firms contacted. The findings of this study were therefore narrowed down to two investment sectors namely commercial/services and manufacturing/assembly. It was found from the findings that the firms were quite familiar with all the six methods but relied more on quality-based methods to achieve continuous improvement. The least used methods were technology-based and process-based methods.

Concerning the operational priorities, quality and reliability were considered very important while flexibility was not quite vital in their operations. With respect to approaches of building improvement programs, most firms used continuous benchmarking and business process improvement approaches while the least popular ones were reconfiguration of structures, demonstration project and bottom up approaches. As for the performance measurement system, most firms used questionnaires to identify areas for improvements.

For the problems or constraints encountered, rapidly changing external environment, communications barriers and insufficient knowledge or proficiency were mentioned as the most serious. The findings also indicated that improvement methods had impact in the following areas, quality of product/service, customer satisfaction, reduced operating costs and increased competitiveness. As for the application production, sales, operations and distributions are situations that require mainly quality-based methods.

On the basis of the findings of the study, a few recommendations have been put forth. First, firms in Kenya rely more on quality-based methods to achieve continuous improvement, a reflection that quality has become a key basis for competition. Secondly firms need to explore possibility of influencing the management thinking in terms of exploiting the other methods i.e. technology-based and process-based improvement methods. The reason is that different strategies often require emphasis on different aspects of performance to which specific improvement methods are directed to effectively and efficiently reduce costs and improve service and value to customers. Lastly, the universities need to create linkage between manufacturing and service sectors and itself so that more emphasis and awareness be cultivated in the OM/MS field.

INTRODUCTION

1.1. Background

Organizations today face an array of choices and challenges. Over the last decade, dramatic economic, political and structural factors have altered the nature of firms. To address these dynamic changes many firms have embarked on campaigns fundamentally to redesign their business processes to enhance their productivity and competitiveness [Alter,1990; McCormick,1991]. In order to remain competitive, firms need to continuously improve on their operations so as to achieve world-class status. This implies that it is important to select improvement methods or techniques that will positively affect organizational performance [Nazim et al,1995].

This study intends to address the issue of improvement methods applied in operations management, extent of their usage and their impact on organizational performance in the context of the Kenyan environment. These improvement methods have been categorized into six based on common perspectives, similar languages and shared tools. Therefore the six improvement methods analysed in these study were the following, quality-based, activity-based, time-based, employee-based, technology-based and process-based methods. This classification is by no means exhaustive [Euske et al,1996].

The need to improve the effectiveness of the operations has, over time, given rise to a series of philosophies, tools and techniques e.g. value engineering, quality circles, flexible manufacturing systems, total quality management and worker empowerment. Each new method or technique, however, left its mark, and found its way into the operations manager's toolbox [Schonberger et al,1997]. The steady stream and changing nature of these methods and techniques vividly illustrates the evolution of the role of operations in firms, and provides a window of insight into the general practical problems of building new operational capabilities. Heizer et al. [1997] describe the process of unending improvement setting and achieving ever higher goals using techniques such as team building, quality circles, benchmarking, JIT, knowledge tools, kaizen, zero defects, six sigma and TQM.

Many articles have described the benefits and general implementation aspects of these methods or techniques. Further, a number of empirical studies have dealt with various aspects of them such as implementation, cost, effectiveness, etc. Most articles focus on a single method or technique such as total quality management, just-in-time management, benchmarking, business process reengineering, activity-based costing, worker empowerment and economic value analysis [Nazim et al,1995; Colin et al,1995; Voss et al,1997; Gunasekaran, 1998]. The focus of this research will be on how Kenyan firms build improvement programs, which methods are used to institute and sustain improvements and their overall impact on firm's performance.

Operations management is concerned with the management of processes, people, technology and other resources in the production of goods and services. Operations management deals with the design of products/services, the design of operations, the planning and control of capacity, materials, quality and resource productivity. There exists in the operations management two main themes; the first is the use of process paradigm and the second is the concept and techniques for designing, managing and improving operational processes. [Colin et al,1995]. According to Hayes et al. [1996], in most organizations both private and public, whether engaged in making goods or delivering services, the bulk of their human and financial resources are invested in their operations functions. Within "operations" we include all those activities required to create and deliver a good or service, from procurement through conversion to distribution. Most of the people employed by an organization are engaged in the operations function and most of the physical assets reside there.

Even when an operation is designed and its activities planned and controlled, the operation's manager's task is not finished. All operations, no matter how well managed, are capable of improvement. Generally this means that what was maybe quite satisfactory a few years ago, today barely passes and quite certainly will soon be below expectations. Even the best operations or processes will need to improve because the competitors will also be improving. In fact in recent years the emphasis has shifted markedly towards making improvement one of the main responsibilities of operations managers [Nigel et al,2001].

According to Schonberger et al. [1997], continuous improvement is becoming a competitive force among leading organizations in services. Although manufacturers have several names for this strategy [Harrison and Storey,1996] e.g. lean, world-class, Toyota production system, the service industries tend to favour a single term, total quality management (TQM). At any rate, continuous improvement has gained prominence as an operations management strategy as well as a business strategy in services as well as in manufacturing. Goetsch et al. [2000] suggest that management's role has changed from one of directing to one of facilitating continuous improvement.

According to Schonberger et al. [1997] vigorous global competition has generated a lot of the newer concepts and methods that address the needs of customers and competencies of competitors, and building on the firm's internal capacities and capabilities. The idea is to continually and incrementally change and improve everything, equipment, procedures, employee skills, throughput time, quality, supplier relation, product and service design and so on. Although each firm is faced with its own competitive challenges as well as its own set of employee skills, technology, financial resources and other resources, so not all firms necessarily attempt the same set of improvements [Dilworth,1992].

The Kenyan economy has for the last decade witnessed major changes following the implementation of such policies leading to economic liberalization. These changes includes among many other policies, removal of import controls, price and foreign exchange control etc. These changes have dictated that firms adjust their structures, designs, operational process, corporate culture and general posture to remain competitive. This competitive environment has therefore led to a process of firms downsizing paired with state of the art technology adoption with the hope of increasing chances for success in the market place. Hence the Kenya manufacturing and service sectors have been experiencing drastic changes in the last few decades. Increased competition due to economic liberalization [particularly conditionalities imposed by the IMF and WB (Mbeche,1997)] and globalisation has resulted in consumers having more choice and being more demanding. Economic barriers have disappeared at an increasing rate. In order to

remain competitive firms must develop competencies in improvement strategies [Nahmias, 2001].

1.2. Research Problem

According to Euske [1996] and Upton [1995] firms are expected to employ the various improvement methods in order to build organizational capabilities, achieve better performance and attain a competitive advantage given the current challenges of globalization, social and environmental responsibilities, technological development and the emergence of the concept of knowledge management that affect their operations and survival in a competitive liberalized world economy. In order to provide answers to the research question about the improvement methods that affect organization operations, the researcher population of study will be the firms listed on the Nairobi Stock Exchange, as they have to maintain high standard of performance owing to stringent listing requirements and investor expectations.

A number of studies have been carried out in Kenya addressing the issue of strategic response of firms to the changing business environment. These studies include the strategic use of international standards ISO 9000 [Kioko,2000] and applications of operational research/ management science in manufacturing firms [Ngacho,1999]. Ngure [2001] findings indicated little demand for process improvement services among Kenyan firms and many are not aware of the potential for improved competitiveness according to the consulting firms. Other research studies in Kenya have looked at the importance of various change processes or methods of improvement such as TQM, BPR, Activity based costing, AMT, Benchmarking and Value analysis in assisting firms attain competitive advantage over it's competitors in selected sectors of the economy. Such studies include Ongwae [2002] on the practices of value based management by firms quoted in NSE, Atebe [2001] BPR at KPLC, Thiga [1999] BPR, a case of KPLC institutional strengthening project, how the process was actual carried out, Mulaki [2000] assessment of the use of value analysis methods by firms quoted in NSE, Amolo [2002] benchmarking the order delivery process for continuous improvement in the oil industry, Oloko[1999] obstacles in the implementation of TQM in the banking sector, Kiruthu [1996] TQM, the status of the manufacturing

sector, Munyi [2000] the use of BPR approach in the pharmaceutical manufacturing industry, Mwangi [2002] advanced manufacturing technologies in agro-based industries and Nzule [1999] adoption of activity based costing systems by selected firms in Kenya.

Whereas the above studies concentrated on a single method or technique, this study looks at the methods from the six classifications perspective family trees, namely quality-based, activity-based, time-based, employee-based, technology-based and process-based methods [Euske et al,1996]. The research intends to answer the question of how firms build improvement programs, the extent of usage of improvement methods and their overall impact on performance. It will also attempt to reflect the desire for a deeper understanding of how firms develop competencies internally using improvement methods.

1.3. Objectives of the Study

The objectives of the study with respect to the Kenyan business environment are:

- (i) To determine the extent of usage of improvement methods by the firms listed on the Nairobi Stock Exchange.
- (ii) To establish whether usage of improvement method lead to better performance.

1.4. Importance of the Study

The findings of the study will stimulate interest among managers and decision makers on the potential of improvement methods for building new operational capabilities.

For business practitioners the findings will assist in identification of problems that face firms in their improvement programs and hence provide them with valuable input into the improvement processes.

The findings will stimulate interest among academicians and encourage further research on improvement methods in management of operations. Aosa [1992] pointed out that the available literature is full of case studies from the west and cannot be replicated without amendments in the firms operating in Africa as it has her own peculiar characteristics manifested in the level of development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Improvement Techniques: Historical Perspective

Kenya's rate of economic growth has been declining steadily since the 1970's and shows no signs of improving. Due to liberalization of the economy, firms, which used to operate in a controlled environment, are now facing competition from imported products. Based on this kind of environment, it is deemed necessary to constantly improve operations within the firm for survival and sustained growth.

Continuous improvement got its start in operations, first in leading Japanese export firms. The idea was to continually and incrementally change and improve everything; equipment, procedures, employee skills, throughput time, quality, suppliers' relations, product and service design [Schonberger et al,1997]. Many western countries realized that corporate success was inherently transitory if not under-pinned by sound operational abilities at the operational-unit level. Various approaches for creating such capabilities may be divided into three distinct phases or philosophies namely structural solution to infrastructural problems, systems solutions and improvement by philosophy, which overlap yet dominate their times [Upton,1995].

2.1.1 Structural Solutions to Infrastructural Problems

In the 70's the problems of operations performance were addressed using structural aspects of their operations strategy. A firm's facilities and sourcing strategies were often adjusted, chopped or wrenchingly changed as regimes of new managers stepped in to "fix" specific operational problems. Restructuring led to organizational units being selected for survival on the basis of their cost or quality performance and under-performing units closed or sold-off or out-sourced to firms that could produce at lower costs. Such methods did rid operating networks of many poorly performing units but reliance on structural methods for improving operating performance failed due to a number of reasons such as failure to incorporate the fact that operations management is a dynamic activity [Upton, 1995].

Therefore organizational units that were unable to improve or performed poorly were pruned. For example Michigan Manufacturing Corporation [Christensen, 1994] closed an old plant in an attempt to improve the aggregate performance of the firm but the fact became clear that this plant had been providing a wide range of important services to the network, from new product development to the manufacture of spare parts.

2.1.2 Systems Solutions

In the 80's technology and computer systems controlled not only individual processes but also coordinated different processes started to look like likely prospect for salvation. Automated systems, which wrested control away from mistake-prone operator while at the same time improving productivity and quality, were touted to be the new panacea. MRP, FMS, CIM promised huge competitive leaps in performance. While these new systems provided great advantage in tackling the informational complexities of manufacturing systems that made a broad range of products and often improved the trade-off between cost and variety, they failed to embody some critical elements of manufacturing competitiveness [Rogers et al,1992].

Long-term success demands creation of more powerful systems that are difficult for competitors to replicate and are steadily being improved. It involves the effective management of all resources available to managers and at the heart of such an engine are the people in the organization, who alone have the capacity to build new abilities as times moves on. Hence improvement was still strongly reliant on the involvement of human being and their ability to learn new tasks and develop new skills [Upton,1992].

2.1.3 Improvement by Philosophy

The failure of systems approached hailed a new wave of improvement philosophies. Empowerment, agility, total quality, "world-class", and reengineering [Hammer et al,1993] each aimed to radically alter the culture of operations, as well as provide a different approaches for building new infrastructural abilities. These new philosophies and techniques provided structures and motivation for the improvement efforts of ailing organizations.

The most important decision for a manager embarking on any improvement path is that of selecting a direction for the path. As Hayes and Pisano [1994] describe, the danger of improvement theme like “world-class” is that they do little to ensure that the long-term direction of improvement will fit with the competitive needs of the business. Any improvement strategy should be closely tailored, in direction and nature, to the peculiarities of the individual firm’s situation.

The most difficult challenge is often that of building an appropriate infrastructure (systems, policies, routines and common values of understandings) rather than the installation of machines, plant and equipment. It is here that the greatest opportunity exists for continuing improvement and where the greatest number of people can be directly involved in the improvement effort and development of new organizational capabilities [Upton,1995].

2.2 Understanding Improvement Methods

Firms face challenges of choosing from a plethora of methods that claim to effectively and efficiently reduce costs and improve service and value to customers. According Euske and Steven [1996] the understanding of the four major components in improvement methods provide a basis for assessing the applicability of a method in specific situation, help identify and define the problem, how to address it and who should address it, the potential weaknesses and opportunities linked to the various methods. The four components identified were as follows: -

- (a) A particular perspective that defines its approach and objective
- (b) A special language or jargon
- (c) Analytical tools and techniques
- (d) Change tools and techniques

In trying to decide on an improvement method, a manager needs to understand [Euske et al, 1996]: -

- (a) How comfortable the improvement team is with the method’s focus or perspective
- (b) How well the team understands the method language

- (c) How much the team knows about the method's tools or how rapidly the team can be trained
- (d) How effectively the team can use the tools to convert its output into specific actions and changes

The basic three ways to select initial improvement method are [Euske et al,1996]

- (a) Allow employee to select the method with which they are most familiar
- (b) Mimic the improvement efforts of the competition
- (c) Use the customer to identify the method

Many issues both internal and external have caused improvements to become necessary in today's marketplace. For example [Andersen,1999]

The performance level of most processes show a tendency to decrease overtime unless forces are exerted to maintain it.

- (i) If an organization does not improve, you can be quite certain that competitors will. Should the unlikely scenario occur that neither an organization nor the competitor improves; there are always other actors willing to enter the market segment.
- (ii) Today's customers are becoming more and more demanding. Supply and the quality of the supply are ever increasing, which in turn cause the expectations to rise dramatically.

Generally this means that what was maybe quite satisfactory a few years ago, today barely passes and quite certainly will soon be below expectations. It is therefore irrelevant to discuss whether we have to improve; the question is rather how much and how fast the improvement should be. There is of course no definitive answer to this, but rather general one is that continuous improvement with breakthroughs is needed [Andersen,1999].

2.3 Operations Documentation

Operations should be viewed as one example of a business process. The key point is that transformed resources originate from outside the boundaries of the firm, and that outputs in the form of goods and services leave the boundaries of the firm [Davenport,1993]. A general rule if wanting to improve something is that it is necessary to know in advance how the current state of things are. If you do not know how the process looks and works today, it will be very difficult to know which improvement initiative can be started and whether they will work at all.

Documenting one's own process should therefore be the first step in any improvement activity [Andersen,1999; Ericsson,1993].

The Deming [Deming,1986] or the cycle plan, do check and act (PDCA Cycle) describes a control loop that illustrates a general approach to conducting continuous improvement. The main purpose of the Deming wheel, besides describing a systematic approach to improvement, is that the wheel should be set into motion through continuously performing this process.

The cycle starts with the P (for plan) stage, which involves an examination of the current method or the problem area being studied. This involves collecting and analysing data so as to formulate a plan of action, which is intended to improve performance. Once a plan for improvement has been agreed, the next step is the D (for do) stage. This is the implementation stage during which the plan is tried out in the operation. Next comes the C (for check) stage where the new-implemented solution is evaluated to see whether it has resulted in the expected performance improvement. Finally comes the A (for act) stage. During this stage the change is consolidated or standardized if it has been successful. Alternatively, if the change has not been successful, the lesson learned from the 'trial' are formalized before the cycle starts again. It is the last point about the PDCA cycle, which is the most important - the cycle starts again. It is only by accepting that in a continuous improvement philosophy the PDCA cycle quite literally never stops that improvement becomes part of every person's job [Nigel et al,2001].

Therefore the PDCA cycle constitutes a complete system for performance improvement where performance gaps are identified, the improvement efforts prioritised, improvement implemented and the result reviewed, before a new gap is established. The challenge is therefore to establish this cycle as a natural part of the organization's way of working with improvements.

2.4 Performance Measurement

Operations need some kind of performance measurements as a prerequisite for improvement. It requires comparison of the current level of achievement of performance with some kind of standard. Performance measurements are therefore

used to evaluate, control and improve operation's process in order to ensure that organizations achieve their goals and objectives. Performance measurements are also used to compare the performance of different organization, plants, departments, teams and individuals and to assess employees [Alaa and Noble, 1996].

Having relevant performance measures for an organization's business processes is important to know where you are today. The general argument for performance measurement is that to improve a process, you must know how well it is performing today. Performance measurement provides information about how well a process is being conducted and how good the results from it are [Andersen, 1999]. It enables a firm to

- (a) Identify processes or areas that need improvement
- (b) Form an impression of the development over time
- (c) Compare your own performance level against that of others
- (d) Assess whether improvement projects started really have or will produce results
- (e) Based on this evaluate what improvement techniques should be used in future

Andersen [1999] states that what get measured, gets done – that is areas emphasized through monitoring and measurement also receive attention and resources. In recent years, the development has been towards operational parameters for performance measurement like quality, cost, speed, reliability, and flexibility as opposed to financial. It is however, beyond the scope of this study to deal with performance measurements in general and in an extensive manner.

As mentioned in earlier paragraph, this study does not intend to deal with performance measurements systems but the dominant dimension in performance monitoring has been financial parameters, often taken directly from the accounting systems. The problem is that such measures have often been in direct conflict with improvement and have hampered actions directed at such operational parameters like time, quality, cost, productivity, reliability and flexibility.

2.5 Building Improvements

In general, initiatives in building improvements are characterized primarily by the approaches described below. Hayes, Wheelwright and Clark [1988] describe these common approaches in building improvement in details.

2.5.1 Reconfiguring the Structures

A common “top down” approach to boosting the performance of an operation is wholesale re-structuring of the operating strategy through plant rationalization and construction, the installation of new technology and Greenfield sites i.e. provide a platform that will permit and encourage continued improvement once the structural change is in place. The adage often used when setting up a new structure is “Do it first, do it fast, do it right”.

2.5.2 Demonstration Project

It provides an opportunity for a firm to make a bold leap in its operating capabilities as it focuses on one part of a firm’s total operation i.e. department or shop. It will assemble the very best people, ideas and technologies to show what can be done and how the operation may be carried out in a radically different way than the operations extant in the firm. Such projects “break free” of existing inhibitive norms in the company, challenges and motivate most able people in the firm to become pioneers and free themselves of the bureaucratic bonds which may have been stifling their imagination and careers.

2.5.3 Continuous Benchmarking

The most valuable form of benchmarking for operations improvement is operational benchmarking, which compares one’s own operations with another using physical, clearly measurable characteristics such as lead times, variable cost, yields, defects. It is a diagnostics method for assessing what degree of improvement is possible but also provides the beginnings of an improvement method in itself.

2.5.4 Functional Improvement

Sometimes the shortcoming in a firm’s operations performance on its principal competitive thrust lie primarily with one function, it thus makes sense to

concentrate on that area and provide it with the help and support it needs from the rest of the firm. Improvements in a particular function can often provide an instructive example of how radical a change is possible and hence provide motivation for other groups.

2.5.5 Business Process Improvement

There are infinite ways to slice an operation up into its constituent processes but some clearly dominate an operation and hence provide an excellent starting point for an improvement path. The focus on process improvement rather than functional improvement grows from the fact that traditional departmental subdivision of operations has become an increasingly frayed approximation to the optimal.

2.5.6 Bottom-up Improvement

Building improvements from the ground up is the implicit objective behind the empowerment craze of the early 90's. Many firms showed tremendous improvements in performance as a result of what might be termed "grass-roots" improvement efforts. It involves a clear understandable message like all political campaigns. The strategy must address why change must occur, what is it that need to be improved, how the improvement will take place and how the change will affect each individual's job.

2.6 Classification of Improvement Methods

Approaches for improving business processes are both abundant and diverse. The classification of these methods can be done according to a number of criteria that includes [Andersen, 1999; Davenport, 1993].

- (a) The extent of change resulting from using the methods
- (b) Requirements from time and resources when using the methods
- (c) Improvement focus or main purposes of the methods
- (d) Source for improvement impulses

The world fortunately is not sufficiently square that all the methods can be singularly defined for each criterion. The classification has been carried out based on the most prominent features of the methods and in complete confidence that exceptions exist. The researcher therefore considers the approach presented by

Euske and Steven [1996] on six improvement methods clustered in trees by common perspectives, similar languages and shared tools, which are quality-based, activity-based, time-based, employee-based, technology-based and process-based methods. In each tree, the methods are most closely related to each other than to those in the other trees. It by no means shows all possible trees.

2.6.1 Quality-Based Methods

The quality-based tree has branches for “gurus” and for written criteria. A major branch, such as written criteria, divides into smaller branches that include the ISO 9000 standards for internal quality and country-sponsored awards such as Japan’s Deming Prize and the Malcolm Baldrige National Quality Award in the United States. More recently quality has become a key basis for competition [George et al,1990].

2.6.2 Activity-Based Methods

The activity-based methods tree include activity costing for identifying the cost of products, customers, and distribution channels and activity-based management for cost reduction, process improvement and budgeting [Player et al,1995]. Throughout much of the past, cost has been a major basis of competition [George et al,1990].

2.6.3 Time-Based Methods

The time-based methods use time-based analysis tools such as cycle-time maps, kanban, setup reduction supplier audits and physical-flow analysis. A “time” perspective relates them. The time based methods tree include JIT, time compression management and time to market. According to George et al. [1990] time-based competition is projected to add further challenges to business.

2.6.4 Employee-Based Methods

Human resources are considered the major assets that make a firm work. Human resources are an important basis for improving the firm [Dilworth,1992]. The employee-based methods tree relate to the human resources perspective. The methods include but not limited, compensation, empowerment, skill-based pay, learning organization, self-directed work teams and broadbanding. The human

related issues are considered as key enablers of improvement/change in an organization [French et al,1994; Cummings et al,1989].

2.6.5 Technology-Based Methods

The technology-based methods are based on the perspective of information systems usage. The tree includes such methods like information transfer, EDI, CIM, CAD, CAM, MRP and DRP. Technology based methods could identify how workers are sharing information [Davenport,1993].

2.6.6 Process-Based Methods

The process-based methods involve studying process components and activities to understand process flow. Taking the current process as a point of departure, it documents elapsed time and expense for each activity. Requirement of customers both internal and external are solicited and used to test the value of each activity. Activities that add no value to process output become candidates for elimination. The tree includes such methods such as Business process reengineering, benchmarking, process mapping and theory of constraints [Davenport,1993].

2.7 Popularity of these Methods

Nazim et al [1995] states that the commonly used methods in industry are TQM a quality-based method, JIT, concurrent engineering, which are time-based methods, benchmarking, business process reengineering, which are process-based methods, computer networking with suppliers and customers, a technology-based method. For instance Euske et al [1996] states that, empowerment, an employee-based method allows people to innovate and use their own judgment, thus it focuses on an individual employee's role. Activity-based costing, an activity-based method identifies costs with outputs and thus focuses on the work that employees perform and the cost of performing it. JIT management, a time-based method reduces waste, delay and unevenness and thus focuses on minimizing their impact on the organization. Using the United States Malcolm Baldrige National Quality award criteria or Japan's Deming Prize, quality-based methods that evaluate internal management practices to improve customer satisfaction. Process mapping, a process-based method takes a process view of interdepartmental processes with ultimate focus on better coordination with upstream suppliers and

downstream customers and more information on key performance data. Benchmarking allows a firm to compare its performance with that of its competitors, which in turn is used as an input for planning to achieve continuous improvement [Nazim,1995].

We could argue that the six classifications of improvement methods identified are not equivalent in terms of their scope and involvement of operations. However, they are all relatively broadbased with each emphasizing different aspects of focus and performance. Some improvement methods are identified with problems that are limited to specific parts of the organization.

2.8 The Conditions that Govern their Choice

The ability to use any improvement method and benefits from its perspective depends on the functional skills and knowledge in a firm. For instance operational managers focus on eliminating flow problems in operations, production waste and bottlenecks. Their language is that of the shop floor, so they discuss material flow, machine layouts, set-up time, and the operational issues that involve production workers. Thus their preferred improvement methods are time-based such as JIT, concurrent engineering, time compression, which focus on time and technology-based methods such as EDI, MRP, CIM, and CAM, which focus on automation. Accountants are likely to prefer activity-based methods such as activity-based costing or management, which focus on cost and related activities. As for the human resources managers, chosen methods for implementing continuous improvement are employee-based methods such as empowerment, skill-based pay, compensation, which focus on more effective use of people [Euske et al,1996; Harrison & Storey,1996]. Studies have indicated that the methods have a bearing on organizational performance [Nazim et al,1995].

2.9 Combining Improvement Methods

A consensus is emerging that successful firms of the next millennium will be those that embrace continuous change as a business paradigm. Such firms will be able to adapt to changes in the market place and to lead the market in directions optimal to the firm's goal by continually adapting their products, processes and internal structures to changes in the business environment [Nigel et al,2001].

The 1990 – 2000 witnessed dramatic shift in paradigms in the manufacturing and service sector of the Kenyan economy. From the predominantly protected business environment in the 70's and 80's to liberalized free market economy. The free market economy created has exposed firms to unpredictable business environment resulting in numerous corporate reorganizations with a view to improving performance and survival. The challenge is thus to determine which method should be applied in a given situation. There are countless good books about different methods for improvement but very few show how they fit together into a large whole. This argument, however, does not lead to a claim that this study does. The focus of this study is not to illustrate how they can be used together in a coherent improvement system but to address the question of how firms build improvement programs, the extent of usage of improvement methods and their overall impact on performance and competitiveness of firms.

The population of the study therefore consisted of Kenya-firms listed in the Nairobi Stock Exchange Handbook 2002, selected so that we could determine the presence of the various sectors of the economy. The NSD comprises of a total of 30 firms in various industry was done so as to take into considered representation from both the manufacturing and service categories.

3.3 Data Collection

Primary data was collected using semi-structured questionnaire consisting of both open-ended and closed-ended questions. The open-ended question aimed to obtain qualitative data on the general overview of the operations improvement initiatives undertaken by the firms while the structured question aimed to obtain quantitative data for statistical analysis. The data analysis in this study was done using the content analysis and statistical analysis. The content analysis was done to identify the presence of improvement initiatives and their implementation. The statistical analysis was done on the basis of "descriptive statistics".

3.4 Data Analysis

The data collected was coded for content analysis. The content analysis was done to identify the presence of improvement initiatives and their implementation. The statistical analysis was done on the basis of "descriptive statistics".

RESEARCH METHODOLOGY

3.1. Research Design

This study is a descriptive type that explores and describes the operations' improvement methods applicable in Kenyan firms [Churchill,1991]. The study was cross-sectional in terms of time dimension.

3.2. The Population

The research targeted firms in both the service as well as in manufacturing sector of the Kenyan economy. The firms quoted in the Nairobi stock exchange provided a good cross sectional analysis of how firms build their improvement programs, the extent of usage of improvement methods and the impact on performance level.

The population of the study therefore consisted of Kenya firms listed in the Nairobi stock exchange handbook 2002, selected so that we could determine the practices in the various sectors of the economy. The NSE comprises of a total of 50 firms. A census study was done so as to take into considered representation from both the manufacturing and service categories.

3.3. Data Collection

Primary data was collected using semi-structured questionnaire consisting of both open-ended and closed-ended questions. The open-ended questions aimed to obtain qualitative data on the general overview of the operations improvement methods and suggestions from the firms while the closed-ended questions aimed to obtain quantitative data for statistical analysis described in the data analysis part. The targeted respondents were the operations managers or equivalents in order to maintain uniformity and consistency. Administration of the questionnaires was done on the basis of "drop and pick later".

3.4. Data Analysis

The data collected was edited for accuracy, uniformity, consistency, and completeness and arranged to enable coding and tabulation before final analysis

[Cooper & Emmy,1998]. Coding and cross tabulation of the data was done to enable the responses be statistically analysed.

DATA ANALYSIS AND FINDINGS

Descriptive statistics was used to analyze data by way of frequency tables, percentage proportions, while qualitative analysis was applied to data that cannot be quantified. Similar study by Yego [1995] used these data analysis techniques described above. The descriptive statistics provided a general picture on how firms build their improvement programs, the extent of usage of improvement methods, performance level in relation to improvement methods and any other issues of importance. The analysis were based on

- (i) Operational priorities in the firms
- (ii) Performance levels in relation to improvement methods
- (iii) Approaches to building improvement programs
- (iv) Familiarity with improvement methods
- (v) The extent of usage of improvement methods
- (vi) Reasons for non usage of improvement methods
- (vii) Situation in which the such methods are applied
- (viii) Problems and issues encountered when using such methods
- (ix) Improvement methods used in the manufacturing and service sectors.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1. Introduction

This chapter analyzes the data collected and presents the findings. The data is summarized and presented in the form of proportions, means and tables. The chapter therefore analyzes the extent of usage of the basic six methods of improvement by firms in Kenya, whether usage of such methods lead to better performance and the challenges facing firms in implementation of their improvement activities. The population of study consisted of firms listed at the Nairobi Stock Exchange. The data was collected from twenty firms out of the forty-four firms contacted. This represented a response rate of 45.6%.

4.2. General Overview of the Firms

The Nairobi stock exchange is usually classified into three major market segments for investment purposes, that are main investment market segment, alternative investment market segment and fixed income securities market segment. The main investment market segment is further subdivided into four categories. The table below illustrates this segmentation and response rate.

Table 4.0 Nairobi Stock Exchange Market Segments

| Main Investment | Category | Firms | Frequency | Percent |
|-------------------------|------------------------|-------|-----------|---------|
| | Agricultural | 4 | None | - |
| | Commercial/Services | 8 | 6 | 75.0 |
| | Finance/ Investment | 11 | 4 | 36.4 |
| | Manufacturing/Assembly | 16 | 10 | 62.5 |
| Alternative Investment | | 9 | None | - |
| Fixed Income Securities | | 1 | None | - |

As it is seen from the table, the majority of those firms that responded are based in the commercial/services and manufacturing/assembly category. Tables 4.1, 4.2, 4.3 and 4.4 below show a summary of the findings based on these two main categories that were identified as per firms' ownership, the industry classification,

years in business/operation and the number of employee. The analysis of the findings henceforth will be based on these two particular categories.

Table 4.1 Firms Ownership Structure

| Ownership | Frequency | Percentage (%) | Valid Percent |
|---------------|-----------|----------------|---------------|
| Local | 11 | 55 | 61.1 |
| Joint Venture | 7 | 35 | 38.9 |
| Not Indicated | 2 | 10 | - |
| Total | 20 | 100 | 100 |

Table 4.2 Industry Classifications

| Industry | Frequency | Percentage (%) |
|----------------------------|-----------|----------------|
| Manufacturing and Assembly | 10 | 50 |
| Commercial and Services | 6 | 30 |
| Finance and Investment | 4 | 20 |
| Total | 20 | 100 |

Table 4.3 Years in Business/Operations

| Number of Years | Frequency | Percentage (%) |
|-----------------|-----------|----------------|
| 31 - 45 | 7 | 35 |
| 46 - 55 | 6 | 30 |
| 18 - 30 | 4 | 20 |
| Over 55 | 3 | 15 |
| Total | 20 | 100 |

Table 4.4 Numbers of Employees

| No of Employees | Frequency | Percentage (%) |
|-----------------|-----------|----------------|
| 1 - 500 | 11 | 55 |
| 500 - 1000 | 5 | 25 |
| Over 2000 | 4 | 20 |
| Total | 20 | 100 |

The ownership structure indicates 66.1% are locally incorporated firms and 38.9% are joint ventures i.e. both local and foreign interest. 50 % of these firms are manufacturing/assembly entities. In terms of years in business all the firms have been operating for well over 18 years and in terms of employee, 55% of these firms having less than 500 employees. This therefore shows that most of these firms have been quite entrenched in their business operations. Thus the need to improve their operational effectiveness on a continuous basis using the available tools in operations management so as to remain competitive in the current local business environment becomes quite essential.

4.3. Operational Priorities In The Firms

Respondents were asked to rate on a 5-point Likert scale the five performance objectives in relation to their improvement activities and overall operational strategy in terms of their importance. The results of these rating are presented in table 4.5 below.

Table 4.5 Operational Priorities

| Operational Priorities | Mean Score |
|-------------------------------|-------------------|
| High Quality | 1.00 |
| Reliability/Dependability | 1.22 |
| Cost Efficiency | 1.56 |
| Speed | 1.61 |
| Flexibility | 2.31 |

As shown by the table based on the mean scores, the following emerges:

- (i) High quality had a mean score of 1.00 and reliability has a mean score of 1.22 indicating that firms attached great importance to quality and reliability probably due to the fact that 50% of the responses were from the manufacturing/assembly sector.
- (ii) Cost efficiency with mean score of 1.56 and speed with mean score of 1.61 showed that the firms considered them important.
- (iii) Flexibility with mean score of 2.31 indicated that firms do not attach much importance to it in terms of their improvement activities and operational strategy probably due to the structural, product design, machinery setup etc may be expensive to alter.

All firms indicated that their operations and processes are fully documented to the extent that persons already familiar may undertake the duties and functions of a job/assignment with minimum supervision and interruptions. Most of the firms instituted the documentation of their operations and procedures through:

- (i) Hired Expertise or Consultants
- (ii) Kaizen
- (iii) Process mapping of activities
- (iv) Business process manual developed or borrowed from international firms/parent companies
- (v) Kenya Bureau of Standards specifications/ISO 9001:2000 specifications

4.4. Performance Measurement System

Having established the importance of operational priorities, respondents were probed further to determine the kind of performance measurement system used as a prerequisite for initiating improvement activities. After an operation has measured its performance, it needs to make judgment as to whether its performance is good, bad or indifferent. Table 4.6 below indicates the results.

Table 4.6 Performance Measurement Systems

| Performance Measurement System Used | No | % |
|--|----|----|
| Performance Measurement Questionnaire (PMQ) | 10 | 50 |
| Strategic Measurement Analysis and Reporting Technique (SMART) | 7 | 35 |
| Balanced Score Card (BSC) | 2 | 10 |
| Six Sigma | - | - |

It was observed from the table that 50% of the respondents use a performance measurement questionnaire in whatever format to measure performance while 35% of the respondents use strategic measurement analysis and reporting technique. None of the firms use the six-sigma measurement system to quantify actions on operational or improvement aspect nor is the BSC commonly used.

4.5. Approaches to Building Improvement Programs

In any firm, there is always the need to review on a continuous basis the operational aspect from time to time and institute improvement programs or activities to ensure that operational strategies are fully realized and objective achieved. Table 4.7 below presents the findings on how firms initiate improvement activities.

Table 4.7 Approaches to Building Improvement Programs

| Approaches Used | No | % |
|-------------------------------|----|----|
| Continuous Benchmarking | 11 | 55 |
| Business Process Improvement | 10 | 50 |
| Functional Improvement | 6 | 30 |
| Demonstration Project | 2 | 10 |
| Bottom up Improvement | 2 | 10 |
| Reconfiguration of Structures | 1 | 5 |

The results indicate that

- (i) 55% of the firms use continuous benchmarking to initiate improvement activities to realize their operational strategy while 50% prefer to use business process reengineering.
- (ii) 30% of the firms use functional realignment of functions, duties and responsibilities to initiate improvement activities.
- (iii) Least popular initiative in building improvement activities is reconfiguration of structures, demonstration project and bottom up approaches.

4.6. Familiarity with Improvement Programs

In the majority of the firms, quite a number of management employees tend to be graduates from tertiary training institutions that offer courses that include among others operation management aspects. Hence most of them are expected to possess formal knowledge of OR/MS tools. The study therefore found it necessary to test the extent of familiarity with operational improvement methods in relation to the performance priorities, performance measurement systems and approaches to building improvement activities. It should be noted here, that we are not trying to establish relationships.

Table 4.8 Familiarities with Improvement Methods

| Method | Extent of Familiarity | | |
|------------------|-----------------------|------------------|-----------------------|
| | Very Familiar | Vaguely Familiar | Completely Unfamiliar |
| | % | % | % |
| Quality-Based | 77.8 | 22.2 | - |
| Time-Based | 70 | 20 | - |
| Activity-Based | 61.1 | 38.9 | - |
| Employee-Based | 61.1 | 38.9 | - |
| Technology-Based | 50 | 50 | - |
| Process-Based | 45 | 45 | 10 |

From the observation taking into account the classification of firms as shown in table 4.2.

- (i) Quality-based methods are very familiar with response rate of 77.8% followed by Time-based methods at 70%.
- (ii) Activity-based and Employee-Based had 61.1%

- (iii) The vaguely familiar methods were Technology-Based and Process-Based at 50% and 45% respectively.

4.7. The Extent of Usage of Improvement Methods

Given the extent of familiarity the study probed further on the extent of usage and the outcome is outlined in table 4.9.

Table 4.9 Extent of Usage of Improvement Methods

| Method | Extent of Usage | | |
|------------------|-----------------|-------------|------------|
| | Commonly Used | Rarely Used | Never Used |
| | % | % | % |
| Quality-Based | 83.3 | 16.7 | - |
| Activity-Based | 66.7 | 22.2 | 11.1 |
| Time-Based | 66.7 | 22.2 | 11.1 |
| Process-Based | 55 | 45 | - |
| Employee-Based | 50.0 | 33.3 | 16.7 |
| Technology-Based | 50.0 | 38.9 | 11.1 |

The results indicate that

- (i) Improvements in operational aspects are Quality-Based as indicated by 83.3% of the responses.
- (ii) Activity-Based and Time-Based indicated 66.7%
- (iii) For Employee-Based, Technology-Based and Process-Based the responses were 50% and 55% respectively

The following tables 4.9a, 4.9b, 4.9c, 4.9d, 4.9e, 4.9f below shows the findings of the study in terms of the actual improvement methods applicable in each particular category. The cut off criteria was 50% for a method to be considered as being used by the firms.

4.7.1 Quality-Based Methods

Table 4.9a Quality-Based Methods

| Methods | Frequency | % |
|-------------------------------------|-----------|----|
| Total Quality Management | 10 | 50 |
| International Standard Organization | 10 | 50 |
| Statistical Process Control | 8 | 40 |
| Written Criteria | 7 | 35 |
| Design for Experiment | 3 | 15 |
| Quality Function Deployment | 2 | 10 |

The most popular method in the quality-based category was total quality management and international standard organization (ISO). The improvement objectives for TQM were client-based satisfaction, quality service and development and motivations of employees. As for ISO the objective was achievement of ISO9001: 2000 and uplift the positions of firms to industry standard.

4.7.2 Activity-Based Methods

Table 4.9b Activity-Based Methods

| Methods | Frequency | % |
|-----------------------------|-----------|----|
| Product Costing | 9 | 45 |
| Customer Costing | 8 | 40 |
| Economic Value Analysis | 7 | 35 |
| Distributed Channel Costing | 4 | 20 |
| Activity-Based Management | 4 | 20 |
| Target Costing | 3 | 15 |
| Activity-Based Costing | 2 | 10 |

From the criteria, none of the methods were considered as being used on regular basis by the firms.

4.7.3 Employee-Based Methods

Table 4.9c Employee-Based Methods

| Methods | Frequency | % |
|-----------------------|-----------|------|
| Compensation | 14 | 77.8 |
| Empowerment | 8 | 53.3 |
| Skill-Based Pay | 9 | 50.0 |
| Learning Organization | 6 | 33.3 |
| Broad banding | 3 | 16.7 |

The most popular method in the employee-based category was compensation, empowerment and skill-based pay. Some of the improvement objectives were

- (i) Reward based on performance indicators
- (ii) Individual productivity be rewarded
- (iii) Make employees responsible and accountable
- (iv) Encourage staff to acquire more skills
- (v) Hard work through knowledge and experience
- (vi) Job role and size determine pay package
- (vii) Pay for the work done

4.7.4 Time-Based Methods

Table 4.9d Time-Based Methods

| Methods | Frequency | % |
|---------------------------------|-----------|----|
| Supplier Certification | 6 | 30 |
| Just in Time | 5 | 25 |
| Total Production Maintenance | 4 | 20 |
| Overall Equipment Effectiveness | 4 | 20 |
| Concurrent Engineering | 2 | 10 |
| Time Compression Management | 2 | 10 |

From the criteria, none of the methods were considered as being used on regular basis by the firms.

4.7.5 Technology-Based Methods

Table 4.9e Technology-Based Methods

| Methods | Frequency | % |
|-----------------------------------|-----------|-----|
| Electronic Data Interchange | 11 | 55 |
| Material Resource Planning | 6 | 30 |
| Computer Aided Design | 5 | 25 |
| Computer Integrated Manufacturing | 4 | 20 |
| Computer Aided Manufacturing | 4 | 20 |
| Manufacturing Resource Planning | None | Nil |

The most popular method in the technology-based category was electronic data interchange. The improvement objectives were

- (i) Data availability as and when needed
- (ii) Seamless integration
- (iii) Networking
- (iv) Efficiency in providing services

4.7.6 Process-Based Methods

Table 4.9f Process-Based Methods

| Methods | Frequency | % |
|--------------------------------|-----------|------|
| Benchmarking | 12 | 66.7 |
| Process Mapping | 6 | 33.3 |
| Business Process Reengineering | 4 | 22.2 |
| Theory of Constraints | 3 | 18.8 |

The most popular method in the process-based category was benchmarking.

On overall Quality-Based methods appear to be more popular, which could be due to the fact that 50% of the responses were from the manufacturing/assembly sector coupled with the latest trend of being ISO certified. This certification address issues of quality in all manner be it customers, product, suppliers etc.

4.8. Situation in which such Methods are Applicable

Regarding the application situation of the mentioned six methods of initiating improvement activities in an organization, the respondents were asked to indicate in which areas they are likely to deploy various OM/MS tools to realize the firms objectives and goals. The findings of the study are indicated in table 4.10. The information presented indicate that some situations require the use of such methods due to the nature of their functions, scopes and output that may require quick and faster reaction to the external environment and competition compared to others that are quite stable and routine in terms of their operations.

Table 4.10 Application Situation

| Situation | Frequency | Proportion (%) |
|------------------------|-----------|----------------|
| Production | 14 | 70 |
| Sales | 12 | 60 |
| Operations | 10 | 50 |
| Distribution | 10 | 50 |
| Human Resources | 8 | 40 |
| Maintenance | 8 | 40 |
| Supplies | 8 | 40 |
| Finance | 7 | 35 |
| Marketing | 7 | 35 |
| Research & Development | 6 | 30 |
| Transportation | 6 | 30 |
| Accounting | 4 | 20 |

It can be observed from the findings that production is the situation that require usage of such methods (70%) followed by sales (60%), operations (50%) and distribution (50%). The findings indicate that the production/manufacturing area tend to apply and use various tools available in operations management to leverage the output process so as to achieve and sustain the operational strategies of a firm in a competitive global environment.

The primary focus in each of the four major situations namely production, sales, operations and distribution are highlighted below.

- (a) Production
 - Customer satisfaction
 - Volume increases and wastage reduction
 - Quality output
- (b) Sales
 - Product marketing and front office service delivery
 - Volume sales and increase market shares
 - Enable best interaction between the customer service employees and customers
- (c) Operations
 - Process improvement and development
 - On time performance
 - Reliability and dependability
 - Improve business process so as to attain set standards
- (d) Distribution
 - Deliveries on time
 - Maximize returns
 - Greater efficiency on product/service delivery

4.9. Impact of Improvement Method on Performance

The respondents were required to state whether the operational improvement programs or activities initiated lead to achievement of better performance levels in the firms. A 3-point Likert scale was used to determine the results as shown in Table 4.11.

Table 4.11 Impact on Performance

| Impact on Performance | Mean Score |
|----------------------------|------------|
| Quality of Product/Service | 2.90 |
| Customer Satisfaction | 2.80 |
| Reduced Operating Cost | 2.58 |
| Increased Competitiveness | 2.58 |
| Market Share | 2.47 |
| Time/Delivery Speed | 2.47 |
| Financial | 2.35 |
| Profitability | 2.35 |
| Transfer of Knowledge | 2.12 |
| Capacity Utilization | 2.11 |
| Employee Job Satisfaction | 1.94 |

A mean score above 2.50 was considered to have large impact on performance while a mean score of between 2.00 and 2.44 had a moderate impact and a mean score of below 2.00 was considered not to have any impact. The following had a mean score above 2.50.

- (i) Quality of Product/Service
- (ii) Customers Satisfaction
- (iii) Reduced Operating Cost
- (iv) Increased Competitiveness

This shows that operational improvement activities initiated by the respondents targeted the above four listed factors.

4.10. Problems and Issues Encountered with Improvement Methods

In applying the operational management improvement programs, firms encounter several problems and difficulties in implementation. The findings in table 4.12 indicate the problems and issues encountered by firms.

Table 4.12 Problems and Constraints Encountered

| Problems | Frequency | Proportion (%) |
|---------------------------------------|-----------|----------------|
| Rapidly Changing External Environment | 16 | 80 |
| Communication Barriers | 12 | 60 |
| Insufficient Knowledge or Proficiency | 12 | 60 |
| Lack of Resources | 8 | 40 |
| Static Internal Environment | 8 | 40 |
| Employee Support | 8 | 40 |
| Difficult to Understand | 7 | 35 |
| Absence of Strategy | 7 | 35 |
| Lack of Organization Support | 5 | 25 |
| Difficult to Apply | 5 | 25 |
| Technological Development | 3 | 15 |

From the observations given by the respondents the following are basically the issues that would affect the implementation of such programs for continuous improvement of their operational aspects, namely

- (i) Rapidly changing external environment
- (ii) Communication barriers
- (iii) Insufficient knowledge or proficiency.

4.11. Methods Used in the Manufacturing and Service Sectors

Table 4.13 represent a cross tabulation between the improvement methods commonly used and the three sector of the economy of Kenya based on the Nairobi stock exchange market segmentation.

Table 4.13 The Manufacturing and Service Sectors

| Methods | Commonly Used | | |
|------------------|-------------------------|------------------------|------------------------|
| | Commercial and Services | Manufacturing Assembly | Finance and Investment |
| Number of Firms | 6 | 10 | 4 |
| | % | % | % |
| Quality-Based | 83.3 | 100.0 | - |
| Activity-Based | 66.7 | 80.0 | - |
| Time-Based | 100.0 | 40.0 | 50.0 |
| Employee-Based | 50.0 | 40.0 | 50.0 |
| Technology-Based | 83.3 | 40.0 | - |
| Process-Based | 83.3 | 40.0 | 50.0 |

The results indicate the quality-based methods rank highly among the respondents both in the commercial/service sectors and manufacturing/assembly sectors. The finance and investment sectors prefer time-based methods but the results should be treated with a word of caution due to the analyzed sample size.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

This chapter summarizes the findings of the study in relation to the objectives of the study. The first objective was to determine the extent of usage of improvement methods available in operations management by the firms listed in the Nairobi stock exchange. The second objective was to establish whether usage of such improvement methods leads to better performance and highlight areas of difficulty or constraints when implementing such programs. General overviews of profile of the firms were necessary due to the diversity in nature and operation of firms listed in the Nairobi stock exchange. It was thus essential and vital to distinguish and identify the investment sectors otherwise the findings would not reflect the true outcome in the context of the Kenyan environment. The findings were therefore narrowed down to the following two investment sectors that participated in the study, which were commercial/services sector and manufacturing/assembly sector.

5.1.1 Familiarity, approaches and application status

The findings enumerated here below provided the means and ways of gauging the first objective of the study. All firms indicated that their operations and processes are fully documented to the extent that persons already familiar may undertake the duties and functions of a job/assignment with minimum supervision and interruptions. Secondly most of the firms instituted the documentation of their operations and procedures through, hired expertise or consultants, kaizen, process mapping of activities, business process manual developed or borrowed from international firms/parent companies or the via Kenya Bureau of Standards specifications/ISO 9001:2000 specifications. Thirdly, the results of the study show that most of the firms were quite familiar with the six operational improvement methods mentioned i.e. quality-based, time-based, activity-based, employee-based, technology-based and process-based. Fourthly, from the findings of the study, the approaches mostly used by firms to improve their operations were either continuous benchmarking or business process improvement, while the least

popular initiative were reconfiguration of structures, demonstration project and bottom up approaches. Lastly, regarding the extent of usage, quality-based methods were the most commonly used. For the situation in which quality-based methods were used, the findings did indicate that major application areas were in production, sales, operations and distribution while the lower application status occurred in accounting, research and development, marketing and finance.

5.1.2 Extent of Usage

On one hand benchmarking and business process improvements are used as inputs for planning to achieve continuous improvement while on the other, quality-based methods seems to be predominately used in the industry. In conclusion, one may say that most of the firms rely to a large extent on quality-based methods for initiating continuous improvement so as to realize their operational objectives as opposed to other methods that are rarely applied. This is quite consistent with what's happening in the industry, where most firms are putting into place mechanism that leads to ISO certification with the following primary focus, quality output, customer satisfaction, volume increases and wastage reduction, service delivery, reliability and dependability and on time performance. Nazim et al [1995] also state that the commonly used method in the industry is TQM, a quality-based method. Therefore in determination of the extent of usage of improvement methods by firms listed on the Nairobi stock exchange, we may thus conclude that the majorities have confined themselves to quality-based methods out off the six methods studied.

5.1.3 Performance Objectives

As for the performance objectives in the firms, in relation to their improvement activities and overall operational strategy in terms of importance, top on the list was high quality and reliability/dependability amongst the respondents. Next on the list were cost and speed and then lastly flexibility, which was considered of lesser importance when looking at performance objectives. In case of performance measurement systems used by firms to identify areas for improvement, the widely used method was the performance measurement questionnaire in order to make judgment as to whether performance was good, bad or indifferent. Most of the firms therefore relied on some form of questionnaire to determine and identify the

operational aspect that may require further addressing so as to rectify deviations, achieve objectives or stay on course.

5.1.4 Impact on Performance

Ultimately, the purpose of improvement methods is to ensure continuous improvements to operational strategy leading to realization of the goals and values of the firms. In this study therefore the impact of improvement method on performance was undertaken with the findings showing that to a large extent the impact was on the following areas, quality of product/service, customer satisfaction, reduced operating cost leading to increased competitiveness. Thus the above findings were in relation to achieving the second objective of the study. In short the usage of improvement methods did lead to better performance in terms of quality, customer satisfaction, reduced operating cost, delivery times and market share. Studies have indicated that the methods do have a bearing on organizational performance [Nazim et al,1995]. But did these translate into profitability and healthier financial status, improved balance sheet from shareholder's point of view and employee satisfaction. Perhaps this is a case for further research. In conclusion, the methods in reference to quality-based, did have a profound impact on particular factors that lead to better performance in certain sphere/areas.

5.1.5 Problems and Constraints

The study in addition, also addressed problems and issues encountered when firms initiate improvement programs and three parameters stood out. These were rapidly changing external environment, communications barriers and insufficient knowledge or proficiency on implementation. Probably this may be the reason why most firms tended to use the quality-based methods as opposed to the others like time-based or technology-based that require proficient knowledge and resources whether in terms of humans, materials or financial etc.

5.1.6 Way Forward

In a nutshell even the best operations or processes will need to improve with time. The competitors will also be striving for improvements. In fact in recent years the emphasis has shifted markedly towards making improvement one of the main

responsibilities of operations managers, as continuous improvement is becoming a competitive force among the leading organizations. The idea is thus to continually and incrementally change and improve everything, equipment, procedures, employee skills, throughput time, quality, supplier relation, product and service design and so on but not all firms necessarily attempt the same set of improvements methods. Increased competition due to economic liberalization and globalization has resulted in consumers having more choice and being more demanding. Economic barriers have disappeared at an increasing rate. In order to remain competitive firms must develop competencies in improvement strategies. This means that Kenyan firms could stop relying only on quality-based methods but also develop competencies in the other five methods mentioned. They may also use the methods together in a coherent manner to leverage performance in every manner and competitiveness of the firms.

5.2. Recommendations

We could argue that the six classifications of improvement methods identified are not equivalent in terms of their scope and involvement of operations. However, the six methods are broadbased with each emphasizing different aspects of focus and performance. This study was based on the six classifications that were, quality-based, time-based, activity-based, employee-based, technology-based and process-based. Arising from the findings of the study, some pertinent recommendations can be made as regards improvement methods in operations management.

5.2.1 Commonly Used Method

The study established, that Kenyan firms rely more on quality-based methods in comparison to the other five methods to achieve continuous improvement. This points to that fact that most firms tend to use ISO certification as criteria to meet the standard in the industry, which is a quality-based method. Also such awards as COYA by Kenya Institute of Management (KIM), Kenya Manufacturer Association (KAM) and Kenya Bureau of Standards (KBS) quality awards reflect that quality has become a key basis for competition.

5.2.2 Rarely Used Method

Another recommendation is that Kenyan firms need to explore the possibility of fully implementing the technology-based or process-based methods by investing substantially in the state of the art equipment. The tendency in most manufacturing entities, is to operate equipment beyond the lifespan and hence the lag in the type of technology used. But again changeover is a time consuming and expensive affair that most firms prefer to undertake such assignment when determined absolutely inevitable. Moreover the past and current economical situation in Kenya may not permit such capital investments that require massive financial outlay.

5.2.3 Awareness in the Industry

Finally it would be quite useful if universities could create a link between the manufacturing and services firms and itself so that more emphasis and awareness be cultivated on the OM/MS field and its important to the overall survival of a firm. In most cases this field of specialization is not quite recognized in the firms listed in the Nairobi stock exchange. Most people tend to associate the field of operations management with production, manufacturing or assembly plants. In a nutshell operations management is concerned with the management of processes, people, technology and other resources in the production of goods and services. Operations management deals with the design of products/services, the design of operations, the planning and control of capacity, materials, quality and resource productivity.

5.3. Limitations of the Study

The main objective of the study was to gather information and data from the forty-nine companies listed in the Nairobi stock exchange so as to reflect the position of certain economically sectors of Kenya with regard to the objectives of the study. But several limitations have to be taken into account. One, only twenty firms responded, of which 80% were confined to two market segments, namely commercial/services and manufacturing/assembly. Two, the questionnaire had no relevance to the operations of nine firms as they mainly engaged in the business of buying and selling products/services.

The most significant constraint to the study was that quite a number of respondents refused to fill or accept the questionnaire citing company policies on relieving information to external parties especially in the banking sector. In other cases the respondents provided incomplete answers or declined to return the questionnaires citing lack of time and too many questionnaires in circulation. Hence this may have affected the quality of the findings and generalization of the results of the study.

5.4. Suggestions for Further Research

This study addressed the issues of using operational improvement methods to achieved organizational goals based on firms listed in the Nairobi stock exchange. It classified such methods into six broad categories. Each of these categories may be studied separately to determine the impact on organizational performance. Further research could be pursued in terms of trying to establish a relationship between particular improvement method and any of the following, profitability, market share, employee or customer satisfaction, financial account, operating costs etc and test whether the usage of improvement methods have a direct or indirect bearing on such factors mentioned. Further study could be done on the area of problems and constrained encountered when applying improvement methods with the view to providing solutions that may lead to smooth implementation while addressing the root causes such problems. Another area that future study could address is to narrow down the economic sector to be analyzed. Still another possible area of study could be purely the service industry in terms of highlighting the challenges that they face in trying to focus, assimilate and implement a particular improvement method or technique such as total quality management, just-in-time management, benchmarking, business process reengineering, activity-based costing, worker empowerment and economic value analysis. In the long run decision makers on policy matters would be able to initiate training activities and reforms based on the potential of improvement methods in building new operational capabilities in organizations.

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Appendix I

Questionnaire

This research is aimed at understanding the extent to which your company and other companies in Kenya build and use the improvement methods in operations management to gain a competitive advantage in a dynamic business environment.

There are no wrong or right answers and the results are confidential and strictly for academic use. Your sincere participation in this survey will be highly appreciated.

Section A: Firm's Profile

1. Company Name:.....
Position Held:.....
Department/Section:.....
2. Describe the ownership of your firm
 - (a) Classification
 - Locally-owned: []
 - Foreign-owned: []
 - Joint-venture (both): []
 - (b) If joint venture then percentage (%) of ownership
 - Largely local owned (more than 50%): []
 - Largely foreign owned (more than 50%): []
 - Equally owned (50%-50%): []
3. What is the industry classification of your firm
 - Commercial and Service: []
 - Manufacturing/Assembly []
 - Agricultural []
 - Finance and Investment []
 - Others (please specify):.....

4. How long has your firm been in existence?.....
5. The number of Employees in the firm:.....
6. What is the annual turnover of the firm in Kshs:.....

Section B Improvement Methods in Operations Management

7. Please rank the following items in order of importance in terms of performance objective on a scale of 1 to 5 (1= very important,... 5= not important).

- | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|
| (a). High Quality | [1] | [2] | [3] | [4] | [5] |
| (b). Reliability/Dependability | [1] | [2] | [3] | [4] | [5] |
| (c). Flexibility | [1] | [2] | [3] | [4] | [5] |
| (d). Cost efficiency | [1] | [2] | [3] | [4] | [5] |
| (e). Speed | [1] | [2] | [3] | [4] | [5] |

8. Does your firm document its processes, procedures or operations?

9. Briefly describe the method(s) used in instituting the documentation in the firm

.....

.....

.....

.....

10. Which department/section is responsible for the documentation?

.....

11. Which performance measurements system does your firm use in order to identify processes or areas that need improvement?

- (a). Balanced Score Card []
- (b). Performance Measurement Questionnaire (PMQ) []
- (c). Strategic Measurement Analysis and Reporting Technique (SMART) []
- (d). Six Sigma []
- (e). Others (Please indicate):.....

12. Which of the following approaches does your firm use when building improvement programs?

- (a). Reconfiguration of Structures []
- (b). Demonstration Project []
- (c). Continuous Benchmarking []
- (d). Functional Improvement []
- (e). Business Process Improvement []
- (f). Bottom up Improvement []
- (g). Others (Please Specify):
.....

13. Indicate the extent to familiarity with the following improvement methods

| | | Very | Vaguely | |
|------------|--------------------------|----------|----------|------------|
| Completely | | Familiar | Familiar | Unfamiliar |
| i.) | Quality-Based Methods | [] | [] | [] |
| ii.) | Activity-Based Methods | [] | [] | [] |
| iii.) | Time-Based Methods | [] | [] | [] |
| iv.) | Employee-Based Methods | [] | [] | [] |
| v.) | Technology-Based Methods | [] | [] | [] |
| vi.) | Process-Based Methods | [] | [] | [] |
| vii.) | Others (Please specify): | | | |
| | | | | |

14. To what extent do you use the following improvement methods in your firm?

| | Commonly Used | Rarely Used | Never Used |
|--------------------------------|------------------|----------------|---------------|
| i.) Quality-Based Methods | [] | [] | [] |
| ii.) Activity-Based Methods | [] | [] | [] |
| iii.) Time-Based Methods | [] | [] | [] |
| iv.) Employee-Based Methods | [] | [] | [] |
| v.) Technology-Based Methods | [] | [] | [] |
| vi.) Process-Based Methods | [] | [] | [] |
| vii.) Others (Please specify): | | | |

15. For the Quality-based methods please tick (✓) the ones used by the firm and briefly describe the improvement objective?

- i.) Total Quality Management []
.....
- ii.) International Standard Organization []
.....
- iii.) Statistical Process Control []
.....
- iv.) Quality Function Deployment []
.....
- v.) Written Criteria []
.....
- vi.) Design for Experiment []
.....
- vii.) Others (Please specify):
.....
.....

16. For the Activity-based methods please tick (✓) the ones used by the firm and briefly describe the improvement objective?

- i.) Distributed Channel Cost []
- ii.) Customer Costing []
- iii.) Product Costing []
- iv.) Activity-Based Costing []
- v.) Target Costing []
- vi.) Activity-Based Management []
- vii.) Economic Value Analysis []
- viii.) Others (Please specify):

17. For the Employee-based methods please tick (✓) the ones used by the firm and briefly describe the improvement objective?

- i.) Empowerment []
- ii.) Compensation []
- iii.) Learning Organization []
- iv.) Skill-Based Pay []
- v.) Broadbanding []
- vi.) Others (please specify):

18. For the Time-based methods please tick (√) the ones used by the firm and briefly describe the improvement objective?

- i.) Concurrent Engineering []
- ii.) Just in Time []
- iii.) Time Compression Management[].....
- iv.) Total Production Maintenance [].....
- v.) Supplier Certification []
- vi.) Overall Equipment Effectiveness[].....
- vii.) Others (Please specify):

19. For the Technology-based methods please tick (√) the ones used by the firm and briefly describe the improvement objective?

- i.) Material Resource Planning II[]
- ii.) Electronic Data Interchange[]
- iii.) Computer Integrated Manufacturing[].....
- iv.) Computer Aided Design []
- v.) Computer Aided Manufacturing[].....
- vi.) Manufacturing Resource Planning[].....
- vii.) Others (Please specify):

20. For the Process-based methods please tick (√) the ones used by the firm and briefly describe the improvement objective?

- i.) Theory of Constraints []
- ii.) Benchmarking []
- iii.) Business Process Reengineering []
- iv.) Process Mapping []
- v.) Others (Please specify):

21. In which situation do you apply improvement methods please tick (√), mention the method and briefly describe the primary focus?

- | | Primary Focus |
|----------------------------------|---------------|
| Production [] | |
| Finance [] | |
| Accounting [] | |
| Operations [] | |
| Human Resources [] | |
| Research & Development [] | |
| Maintenance [] | |
| Sales [] | |
| Supplies [] | |

.....

Marketing []

.....

Transportation []

.....

Distribution []

.....

Others (Please specify):

.....

.....

.....

22. Please indicate the areas in which the firm does apply the improvement methods commonly used?

| | QB | AB | TB | EB | CB | PB |
|------------------------|-------|-----|-----|-----|-----|-----|
| Production | [] | [] | [] | [] | [] | [] |
| Finance | [] | [] | [] | [] | [] | [] |
| Accounting | [] | [] | [] | [] | [] | [] |
| Operations | [] | [] | [] | [] | [] | [] |
| Human Resources | [] | [] | [] | [] | [] | [] |
| Research & Development | [] | [] | [] | [] | [] | [] |
| Maintenance | [] | [] | [] | [] | [] | [] |
| Sales | [] | [] | [] | [] | [] | [] |
| Supplies | [] | [] | [] | [] | [] | [] |
| Marketing | [] | [] | [] | [] | [] | [] |
| Transportation | [] | [] | [] | [] | [] | [] |
| Distribution | [] | [] | [] | [] | [] | [] |
| Others (specify): | | | | | | |
| | | | | | | |
| | | | | | | |

Abbreviations: *QB* – *Quality Based*, *AB* – *Activity Based*, *TB* – *Time Based*, *EB* – *Employee Based*, *CB* – *Technology Based*, *PB* – *Process Based*

23. To what extent does improvement methods employed by your firm help in achieving objectives related to the following: (Please Tick \surd)

| | Less Extent | Moderate Extent | Large Extent |
|---------------------------------|----------------|--------------------|-----------------|
| (a). Financial Performance | [] | [] | [] |
| (b). Customer Satisfaction | [] | [] | [] |
| (c). Market Share | [] | [] | [] |
| (d). Quality of product/service | [] | [] | [] |
| (e). Time/delivery Speed | [] | [] | [] |
| (f). Profitability | [] | [] | [] |
| (g). Capacity Utilization | [] | [] | [] |
| (h). Employee Job Satisfaction | [] | [] | [] |
| (i). Reduced Operating Cost | [] | [] | [] |
| (j). Transfer of Knowledge | [] | [] | [] |
| (k). Increased Competitiveness | [] | [] | [] |

24. What problems do you encounter while generally using the improvement methods

(Please Tick \surd)

- i.) Difficult to understand []
- ii.) Lack of resources []
- iii.) Lack of organization support []
- iv.) Difficult to apply []
- v.) Absence of strategy []
- vi.) Communication barriers []
- vii.) Static internal environment []
- viii.) Rapidly changing external environment []
- ix.) Technological developments []
- x.) Lack of management consultants []
- xi.) Familiar with the language used []
- xii.) Insufficient knowledge or proficiency []
- xiii.) Employee support []
- xiv.) Others (Specify):

Thank you for your assistance and cooperation

Appendix II

Firms Listed At the Nairobi Stock Exchange

Population Size 50 Firms Listed at Nairobi Stock Exchange as at March 2003

- | | |
|--|---|
| 1 Brooke Bond Limited | 26 B.O.C Kenya Limited |
| 2 Kakuzi limited | 27 Bamburi Cement Limited |
| 3 Rea Vipingo Limited | 28 British American Tobacco Kenya Limited |
| 4 Sasini Tea & Coffee Limited | 29 Carbacid Investments Limited |
| 5 African Lakes Corporation PLC | 30 Crown Berger Limited |
| 6 Car & General(K) Limited | 31 Dunlop Kenya |
| 7 CMC Holding Limited | 32 E.A. Cables Limited |
| 8 Hutchings Biemer Limited | 33 E.A. Portland Cement Limited |
| 9 Kenya Airways Limited | 34 East African Breweries Limited |
| 10 Marshaall(E.A.) Limited | 35 Firestone East Africa Limited |
| 11 Nation Media Group | 36 Kenya Oil Company Limited |
| 12 Tourism Promotion Services Limited | 37 Mumias Sugar Company Limited |
| 13 Uchumi Supermarket Limited | 38 Kenya Power & Lighting Company Limited |
| 14 Barclays Bank Limited | 39 Total Kenya Limited |
| 15 C.F.C Bank Limited | 40 Unga Group Limited |
| 16 Diamond Trust Bank Kenya Limited | 41 A. Baumann & Company Limited |
| 17 Housing Finance Company Limited | 42 City Trust Limited |
| 18 I.C.D.C Investments Company Limited | 43 E.A. Packaging Limited |
| 19 Jubilee Insurance Company Limited | 44 Eaagads Limited |
| 20 Kenya Commercial Bank Limited | 45 Express Limited |
| 21 National Bank of Kenya Limited | 46 Williamson Tea Kenya Limited |
| 22 NIC Bank Limited | 47 Kapcharua Tea Company Limited |
| 23 Pan Africa Insurance Limited | 48 Kenya Orchads Limited |
| 24 Standard Chartered Bank Limited | 49 Limuru Tea Company Limited |
| 25 Athi River Mining | 50 Standard Newspapers Group |



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 Nairobi, Kenya

DATE.....

TO WHOM IT MAY CONCERN

The bearer of this letter

Registration No:

is a Master of Business Administration (MBA) student of the University of Nairobi.

He/she is required to submit as part of his/her coursework assessment a research project report on some management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate if you assist him/her by allowing him/her to collect data in your organization for the research.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

(Handwritten signature)
DR. MARTIN OGUTHI
CO-ORDINATOR, MBA PROGRAM

(Circular stamp: UNIVERSITY OF NAIROBI, M. B. A. OFFICE, P.O. Box 30197, UNIVERSITY COMMERCE)